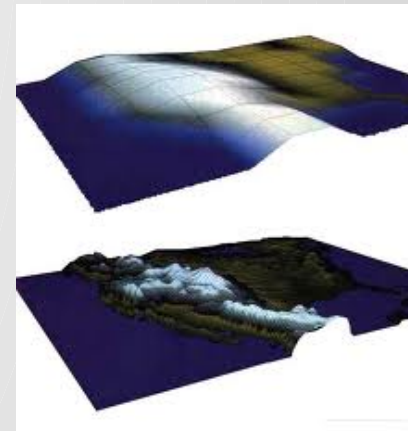
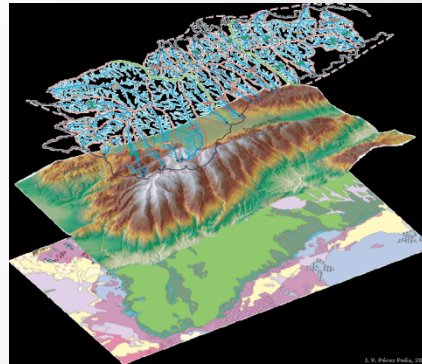


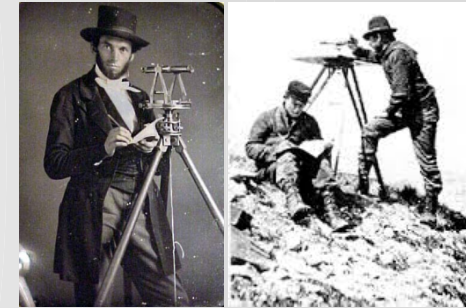
Surveying



Background



- Surveying is a necessary step in any construction, water pattern analysis or land mapping project
- The process in land mapping, elevation recording and site analysis
- Has been a profession since the creation of the first maps
- One famous line created in the United States through surveying is the Mason Dixon Line, which separated the North from the South



Tools



- Stadia rods (boards) –sophisticated prism reflectors or direct-reading laser boards
- calibrated measuring sticks
- pocket transits
- map table both optical and laser
- electronic distance measuring equipment
- Global Positioning System(GPS)
- electronic data collectors
- measuring tapes; plumb bobs

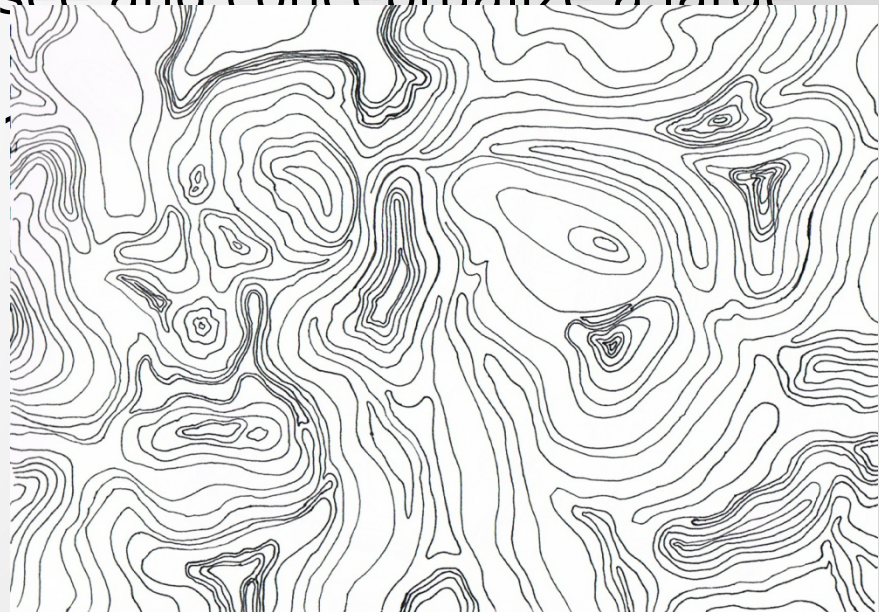


Vocabulary

- *Surveying*- collecting data and characteristics of a piece of land and creating maps, charts and models out of that information
- *Section cut*- a view of a specific slice of the interior of an object or collection of objects.
- *Section plan*- a two-dimensional depiction of a specific slice of the interior of an object or collection of objects.
- *Topographic map*- a detailed map portraying the contours of the surface of a landscape. They are often very detailed.
- *Elevation*- height above sea level
- *Peak*-The highest point
- *Slope*- an incline. Can be calculated by rise/run. Often shown as a percentage.
- *3-dimensinal model*- a representation with height, depth and width.

Topographic Maps

- What are they?
 - 2-D representation of a 3-D area
 - X-Y plane shown, Z represented by lines and labeled points
- Why create them?
 - Easy way to visually see and conceptualize a large area
- What can they tell us?
 - Peaks
 - Valleys
 - Flat areas
 - Steepest areas
 - General shape
 - Water



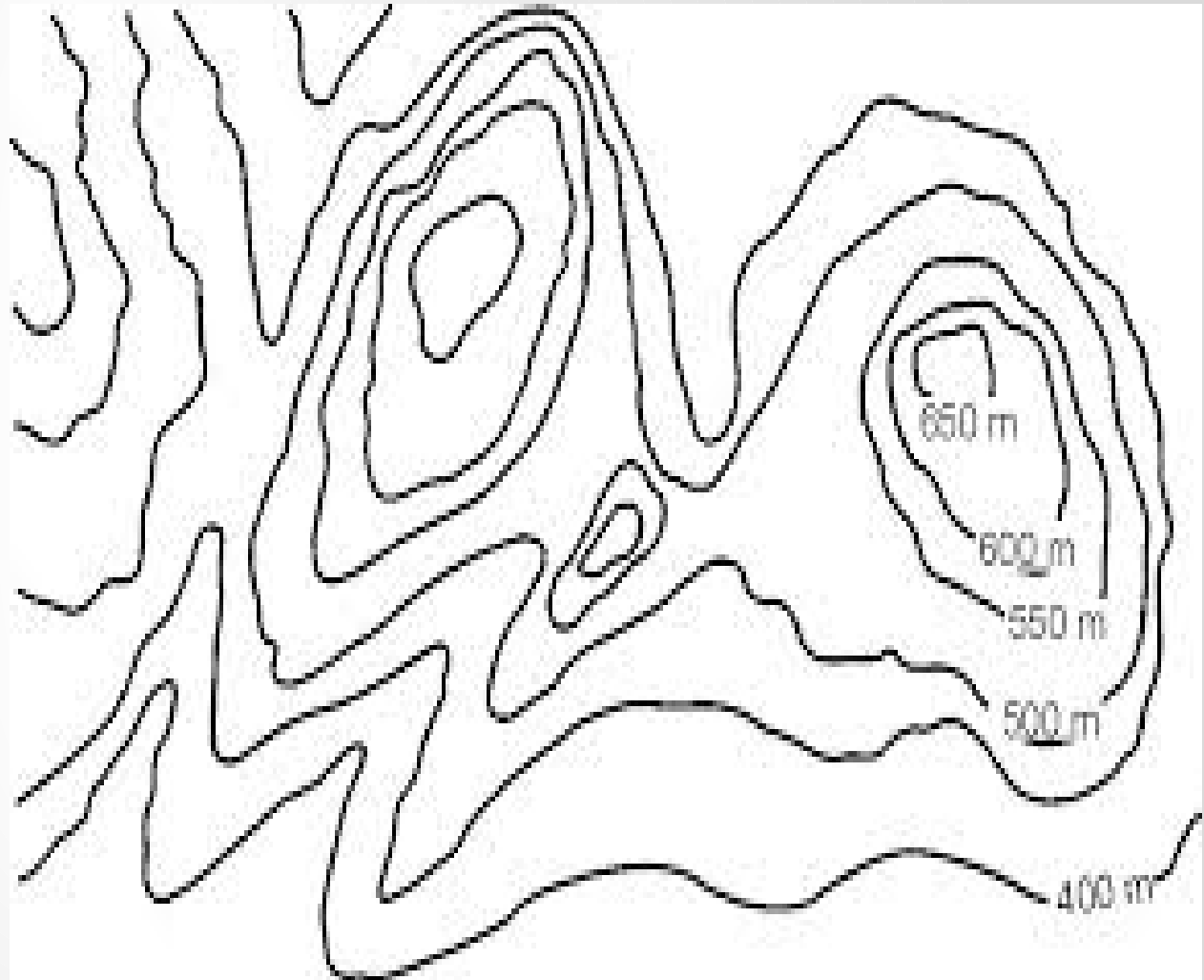
Reading a Topographic Map

- Each ring represents a shared elevation
- Every cross or point that is labeled represents a peak
- Can you determine the areas with the steepest slope?
- Can you determine the most flat regions?



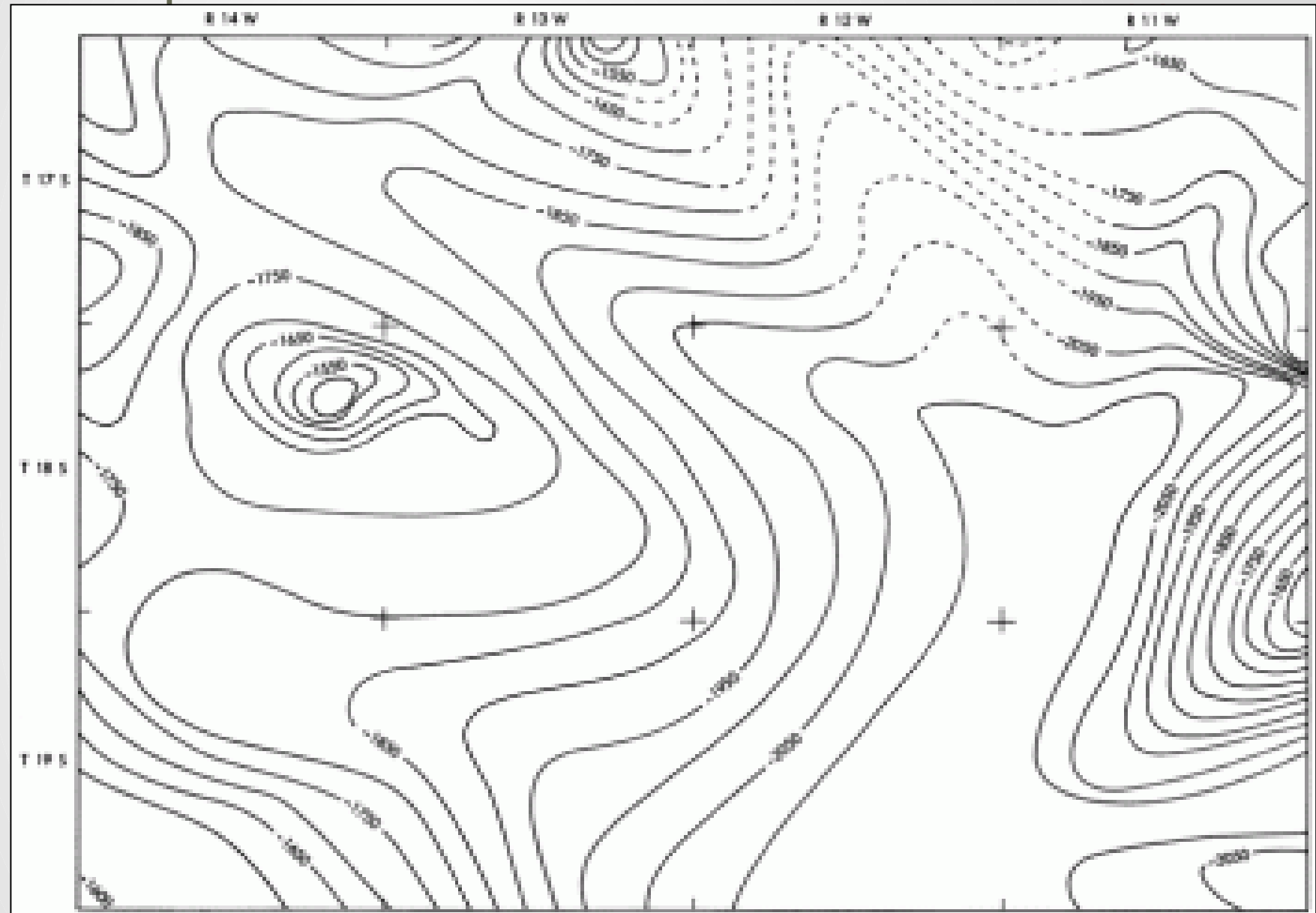
Warm-up Activity

- Identify:
 - Peaks
 - Valleys
 - Flattest areas
 - Steepest slope
 - Where water may flow



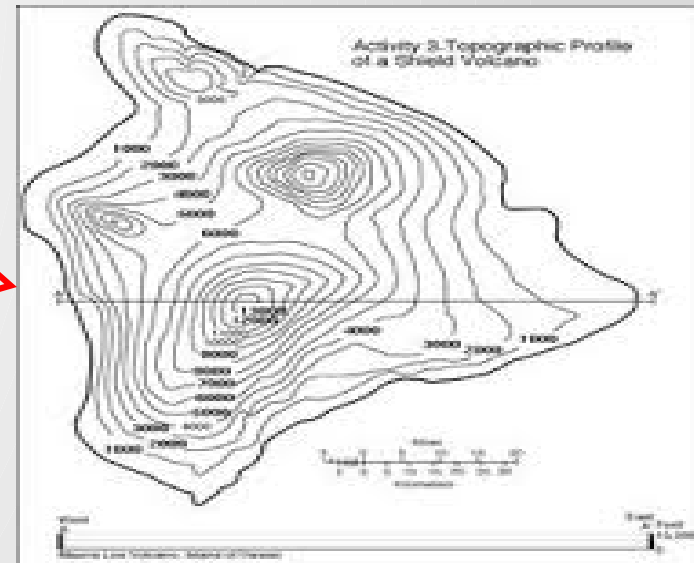
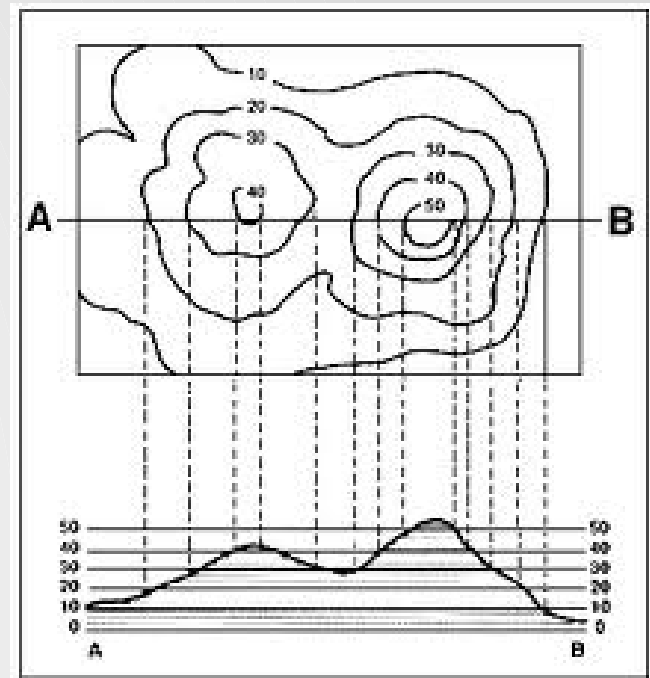
Topographic mapping

example

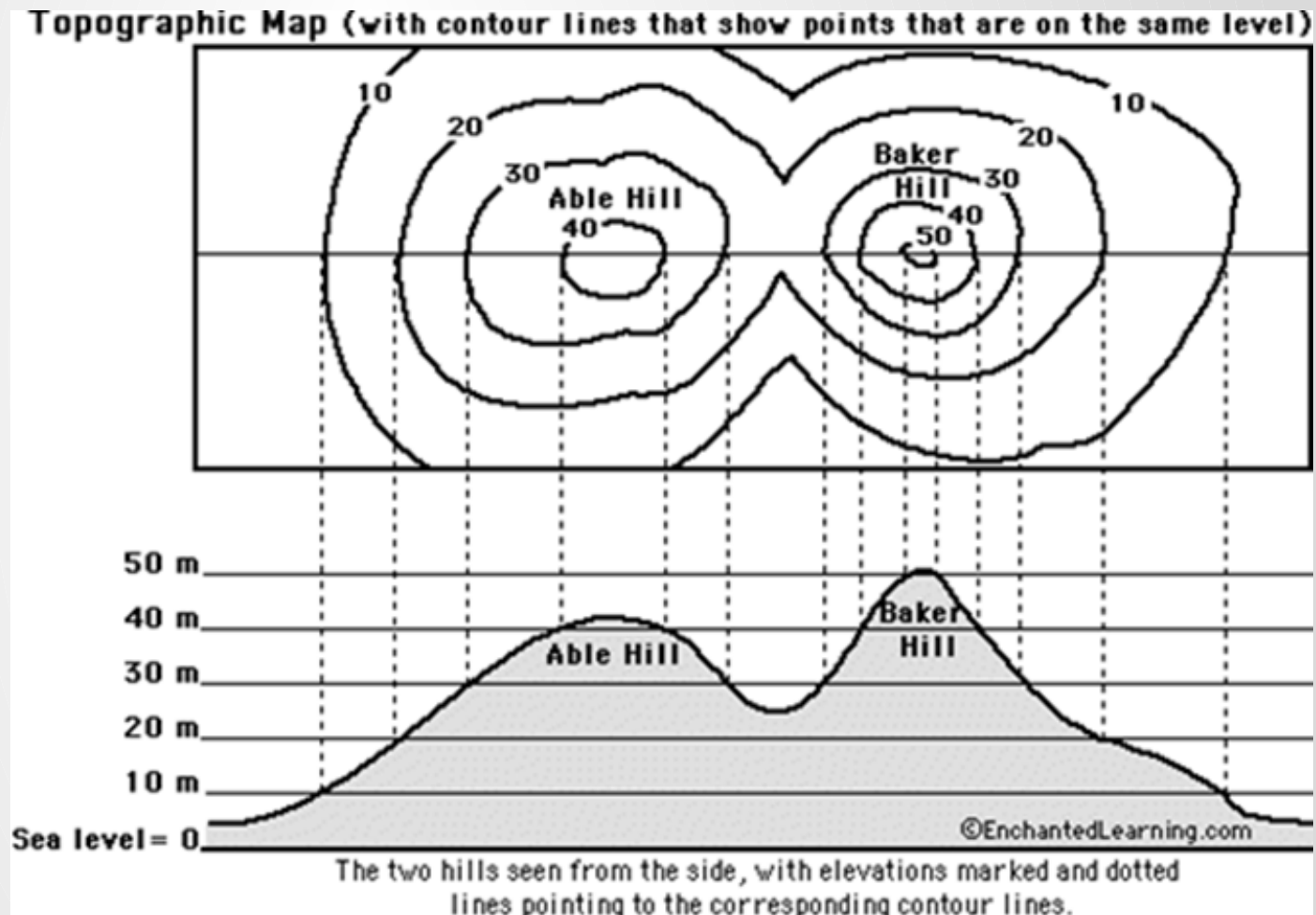


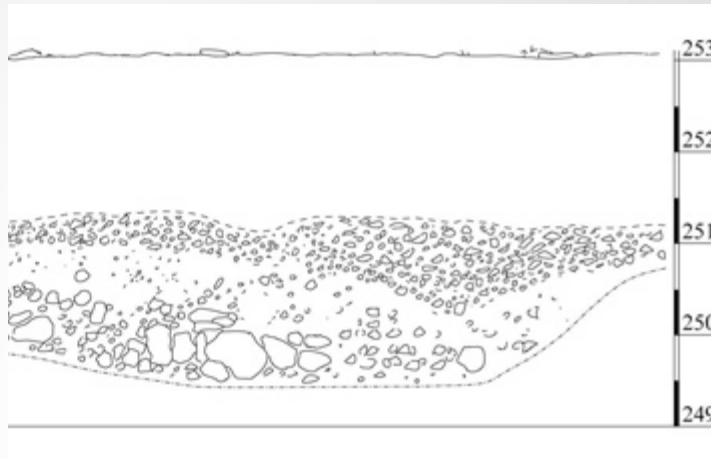
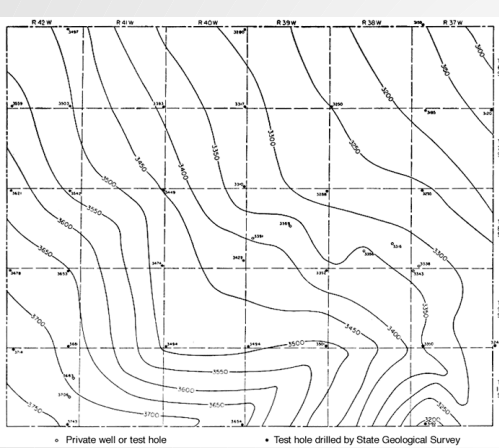
Section Views

- A cut slice of a 3-D object
- Often vertical
- Shows what is inside of an object in 2-D form
- Area cut shown on topographic map through labeled line with arrows at the end



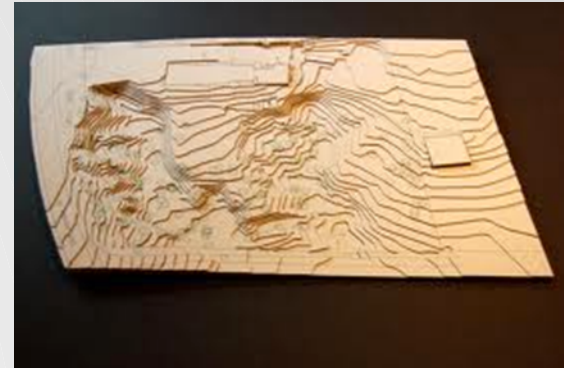
Section View Example





Activity: How Steep are those hills?

Task



- Groups of 2-3
- You will have two class periods
 - First day: complete the topographic map and section plans (Steps 1-3)
 - Second day: Create 3-D model and complete discussion questions (Step 4 and Discussion Questions)
- Create a topographic maps from elevation points
- Construct two section views from your topographic map
- Create a 3-D model of your site from your map and graphs
- Make prediction about the site from the visuals you have created

Materials

- Pencil
- Paper with initial data points 2 pieces of graph paper
- Ruler
- Tape 1' X 1' piece of cardboard
- Clay
- Small cup of water
- Plastic knife

	A	B	C	D	E	F	Ave.
i	1.95 +	1.81 +	1.77 +	1.90 +	1.92 +	1.90 +	1.876
ii	1.80 +	1.71 +	1.62 +	1.78 +	1.69 +	1.68 +	1.712
iii	1.67 +	1.59 +	1.51 +	1.64 +	1.53 +	1.54 +	1.578
iv	1.43 +	1.39 +	1.46 +	1.51 +	1.53 +	1.54 +	1.455
v	1.21 +	1.32 +	1.46 +	1.50 +	1.52 +	1.48 +	1.418
vi	1.36 +	1.45 +	1.49 +	1.50 +	1.52 +	1.51 +	1.473
vii	1.48 +	1.47 +	1.49 +	1.47 +	1.48 +	1.51 +	1.484
viii	1.47 +	1.48 +	1.42 +	1.46 +	1.36 +	1.40 +	1.430
Ave.	1.549	1.529	1.531	1.599	1.575	1.560	<u>1.557</u>

1.47
+ field grid point elevation

Ideas to Consider

- How could we reverse this process if we started with a model and needed a topographic map?
- How could surveying be used to record change on a given site? How could the change be shown visually?
- Is surveying used for reasons other than construction projects? What are some examples?

Careers

- *Surveyor/ Cartographer*

- Education:
 - BS Degree in related field and/or Apprenticeship
- Responsibilities:
 - record, map and survey sites
 - Create maps, models and charts
 - Relay information to planners



- *Architect/ Landscape Architect / Civil engineer*

- Education:
 - Bachelor's Degree and Certification
- Responsibilities:
 - Design buildings , gardens, parks, roads, bridges, etc.
 - Create models and graphs, both by hand and through computer programs



- *Urban/Regional Planner*

- Education:
 - Master's Degree and Certification
- Responsibilities:
 - Collect the local residents opinions and ideas through surveys, town meetings and forums
 - Construct and write comprehensives plans
 - Analyze regional factors such as population, demographics, income, etc. over time